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AMBIENT CONCENTRATIONS OF PCB's IN THE SOUTHEAST FROM STORET DATA AND SELECTED EPA STUDIES

OCTOBER 1977

ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION
ATHENS, GEORGIA

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16. Abstract
The PCB problem in the southeast came to light in 1976 with the discovery of high concentration of PCBs in fish tissues collected from Lakes Weiss and Hartwell. Tissue, sediment and water data from these lakes are reported and analyzed.

Big Cypress Swamp data are presented and analyzed to determine background concentrations of PCBs in areas remote from human activities.

STORET data for the states of NC, SC, GA, FL, AL, MS, TN and KY were analyzed and all stations having one or more concentrations greater than 100 µg/kg PCBs in sediments and 0.1 µg/l in whole wates are reported and potential problem areas are defined. The extent of the PCB problem is evaluated and recommendations are made regarding future sampling needs.

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AMBIENT CONCENTRATIONS OF PCBs IN THE SOUTHEAST FROM STORET DATA AND SELECTED EPA STUDIES

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AMBIENT CONCENTRATIONS OF PCBs IN THE SOUTHEAST FROM STORET DATA AND SELECTED EPA STUDIES

INTRODUCTION

PCBs and many other similar organic compounds are concentrated in biological tissues by biomagnification through the food chain and through absorption from the water. The magnitude of the environmental PCB hazard in the Southeast has only recently been brought into focus. Previously, environmental agencies had not been sufficiently monitoring critical portions of the environment for toxic, mutagenic, and carcinogenic compounds. Water and sediment samples had been routinely analyzed, but only a few fish flesh samples had been collected. This still remains a critical area which needs many more resources for effective monitoring programs.

The discovery of PCB concentrations in excess of the U. S. Food and Drug Administration (FDA) "action level" in edible portions of fish (5.0 mg/kg) caught in Lake Hartwell led to an intensive sampling program in this area beginning in the Spring of 1976. Subsequently, a similar survey was conducted in the Upper Coosa River Basin. A warning against consumption of fish from the Seneca River arm of Lake Hartwell has been issued jointly by the South Carolina Department of Health and Environmental Control (SC-DHEC) and the U. S. Environmental Protection Agency (EPA). As a result of actions initiated by the Georgia Department of Natural Resources (GA-EPD)(1), the following areas are currently closed to commercial fishing: the Coosa River from the Georgia-Alabama stateline to Rome, the Etowah River from its confluence with the Oostananla to the US 441 bridge, and the Oostananla River from its confluence with the Etowah to the GA 156 bridge.

STANDARDS

The first area of concern in developing and maintaining a PCB water quality criterion is the protection of humans from the ingestion of PCBs in

food and/or water. PCBs in food are regulated by the FDA (for interstate commerce) and the EPA has authority to establish maximum concentrations in drinking water. The FDA has established the "action level" of 5 mg/kg for total PCBs in edible tissues on a wet weight basis. EPA has not yet established a limit for PCBs in drinking water because of lack of chronic health-effect information available. In the absence of maximum contaminant level in drinking water, a concentration of 1 µg/l is being used as the "level of concern" (2).

The second area which must be considered is the protection of indigenous species of aquatic life and the consumers thereof. This portion of the problem is approached through the use of stream classifications for the protection of "fish and wildlife." The Quality Criteria for Water (3) gives guidance for developing applicable standards. The criterion for the protection of "freshwater and marine aquatic life and for consumers thereof" is a maximum concentration of 0.001 µg/l (1 ng/l) of total PCBs. This level is below the practical detection limit of standard methodology but is necessary due to the high degree of bioaccumulation of PCBs. Preliminary research indicates that tissue concentration should not exceed 0.5 mg/kg for the protection of carnivorous mammals (e.g., mink, raccoon, otters, etc.) whose diets consist primarily of fish and other aquatic animals.

BACKGROUND CONCENTRATIONS

The wide dissemination of PCB, DDT and other persistent man-made organic compounds requires that background concentrations be established, since nearly all living organisms will contain at least trace quantities of these compounds, and only when measured concentration exceed background levels can localized contamination be detected. In an attempt to establish background levels of PCBs for the southeast, data from the Big Cypress Swamp (4) for January through November 1972 were analyzed (See Tables 1 and 2). This area was chosen because

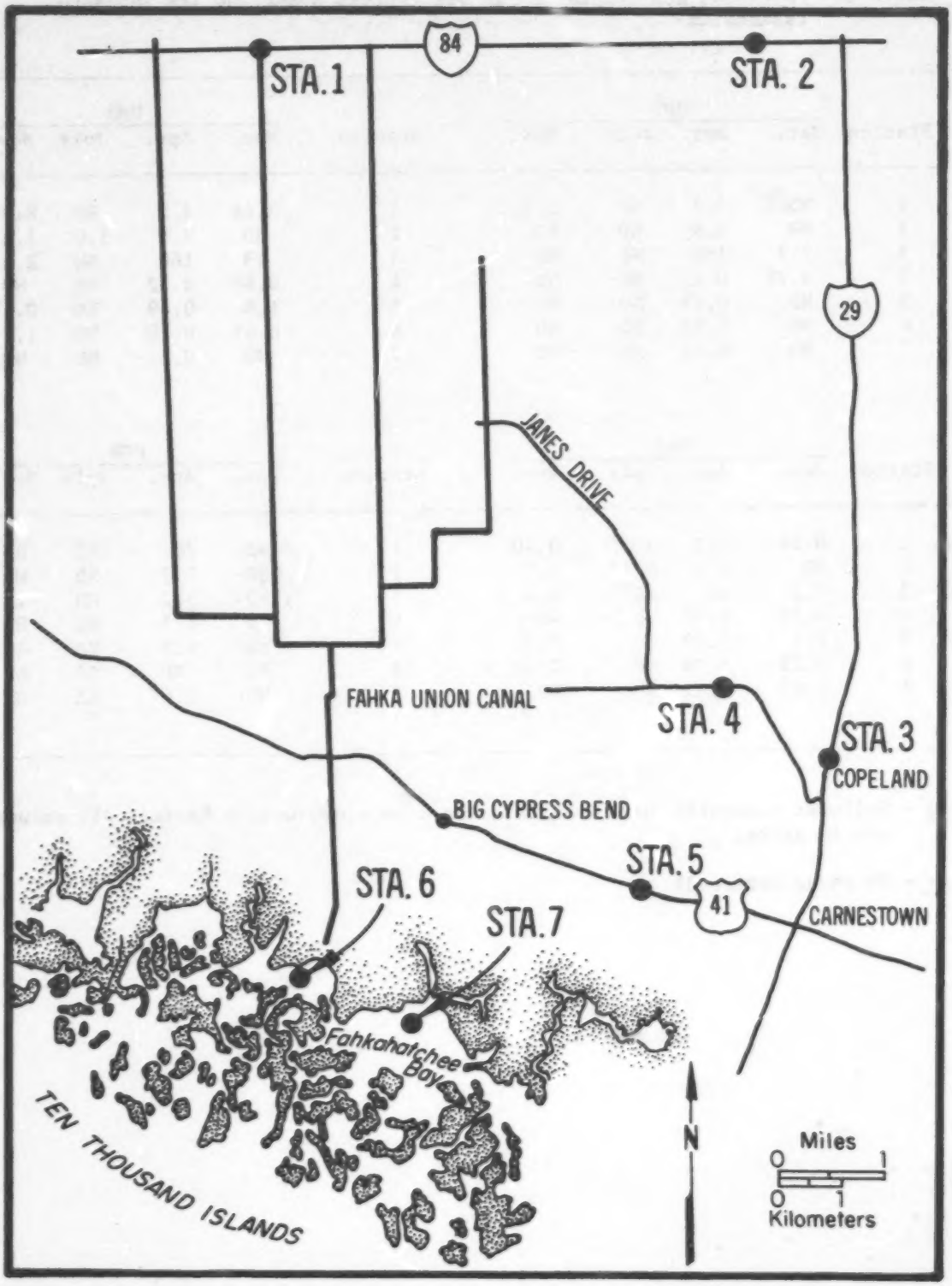

Figure I. Location of the Pesticide and PCB Stations in Big Cypress Swamp and Ten Thousand Islands.

Table 1. Pesticide and PCB Levels in Big Cypress Swamp and Ten Thousand Islands./a

Station	DDT Jan.	DDT Apr.	DDT July	DDT Nov.	Station	DDD Jan.	DDD Apr.	DDD July	DDD Nov.
1	ND/b	3.2	ND	2.2	1	0.48	3.2	ND	0.88
2	ND	2.9	ND	ND	2	ND	2.9	1.0	1.4
3	2.7	160	ND	ND	3	13	160	ND	2.6
4	0.78	0.22	ND	ND	4	0.68	0.22	ND	ND
5	ND	0.69	ND	ND	5	1.8	0.69	ND	0.44
6	ND	0.58	ND	ND	6	0.61	0.58	ND	1.7
7	ND	0.22	ND	ND	7	ND	0.22	ND	ND

Station	DDE Jan.	DDE Apr.	DDE July	DDE Nov.	Station	PCB Jan.	PCB Apr.	PCB July	PCB Nov.
1	0.14	2.3	ND	0.40	1	ND	20	ND	ND
2	ND	2.4	0.73	1.1	2	130	5.7	ND	ND
3	4.2	96	ND	1.1	3	ND	5.2	ND	11
4	0.39	0.09	ND	ND	4	8	1.5	ND	ND
5	1.1	0.29	ND	0.37	5	ND	4.1	ND	4.2
6	0.23	0.28	ND	0.89	6	ND	ND	ND	ND
7	0.09	0.21	ND	ND	7	ND	2.6	ND	ND

/a - Sediment concentrations were calculated on a dry weight basis. All values are in µg/kg.

/b - ND (None Detected).

Table 2. Pesticide and PCB Analyses on Biological Samples from Big Cypress Swamp and Ten Thousand Islands for January, 1972. /a

Station No.	Type of Sample	Size Range Total Length (mm)	DDE µg/kg	DDD µg/kg	DDT µg/kg	PCBs µg/kg
1	Largemouth bass	84	11	2.8	7.0	35.
1	Brook silversides	32-82	6.8	0.7	2.3	12.
1	Spotted sunfish	122-134	4.2	1.1	2.3	12.
2	Florida gar	362	8.6	52.	25.	38.
2	Golden shiner	162	0.6	0.3	ND/b	8.6
2	Redear sunfish	179	2.3	4.8	2.3	22.
3	Brook silversides	40-69	9.5	5.7	1.7	22.
3	Gambusia	19-40	26.	15.	9.1	42.
3	Florida gar	486	200.	94.	40.	110.
4	Flagfish	22-36	8.1	6.8	4.6	24.
4	Gambusia	22-46	18.	11.	10.	31.
4	Marsh killifish	83	23.	14.	11.	52.
5	Gambusia	17-44	16.	12.	6.5	28.
5	Florida gar	471	24.	20.	4.0	34.
5	Largemouth bass	197	9.2	11.	5.4	104.
6	Sheepshead	256	8.0	7.2	2.0	37.
6	Mangrove snapper	215	5.8	3.2	1.6	47.
6	Eastern oysters	-	0.7	1.0	0.76	22.
7	Sheepshead	380	12.	3.1	2.8	47.
7	Mangrove snapper	240	7.8	3.8	2.0	35.
7	Eastern oysters	-	1.7	1.8	1.0	16.
8/c	Snook A	228	42.	51.	11.	85.
8	Snook B	156	40.	56.	12.	120.

/a - Based on whole fish analyses, calculated on a wet weight basis.

/b - ND (None detected).

/c - Station 8 was a station on Henderson Creek.

Table 3. Pesticide and PCB Analyses on Biological Samples From Big Cypress Swamp and Ten Thousand Islands for April, 1972. /a

Station No.	Type of Sample	Size Range Total Length (mm)	DDE µg/kg	DDD µg/kg	DDT µg/kg	PCBs µg/kg
1	Bowfin	561	8.7	9.1	6.3	ND/b
1	Florida gar	662	320.	59.	4.5	110.
1	Yellow bullhead	313	3.2	3.9	2.3	ND
2	Bluegill	101-236	14.	7.8	17	26.
2	Warmouth	116	3.4	ND	ND	ND
2	Spotted sunfish	86-201	7.4	3.8	6.8	23.
3	Bluegill	122-135	6.1	8.8	8.6	16.
3	Redear	98-129	6.7	3.4	4.0	ND
3	Gambusia	18-34	34.	48.	7.2	38.
4	Spotted sunfish	112-120	8.9	8.0	5.7	13.
4	Striped mullet	378	7.4	13.	5.5	76.
4	Gambusia	19-38	36.	13.	5.7	11.
5	Sailfin molly	28-56	14.	19.	13.	14.
5	Striped mullet	87	2.2	1.0	ND	ND
5	Redfin needlefish	316-318	24.	22.	16.	ND
6	Sheepshead	387	13.	9.3	3.8	ND
6	Gafftopsail catfish	428	12.	12.	7.6	ND
6	Eastern oyster	-	18.	1.6	7.4	ND
7	Sheepshead	300	8.	1.2	6.3	ND
7	Crevalle jack	288	32.	4.8	7.2	76.
7	Eastern oyster	-	12.	1.3	ND	20.

/a - Whole fish analysis calculated on a wet weight basis.

/b - ND (None detected).

the impact of human activity was considered minimal. Apparently, from these data, backgrounds as high as 30 µg/kg in sediment and 120 µg/kg in tissue can be expected.

In January, Station 2 had a PCB concentration of 130 µg/kg in sediments; a concentration which varied greatly from the other observed values. This station is located along FL 84 (See Figure I) which would make it susceptible to PCB contamination from electric transformers or other sources, thus this observation was not considered indicative of a true background level.

CONTAMINATED AREAS

The two problem areas mentioned in the introduction of this report, Coosa River - Lake Weiss and Lake Hartwell, have been under extensive investigation by GA-EPD, AWIC (Alabama Water Improvement Commission) and EPA; and GA-EPD, SC-DHEC, and EPA, respectively. This section presents an analysis of the data collected in these two areas. Much of the data collected are on fish tissue samples collected by electro-fishing. Concentrations are reported on a wet weight basis for edible fillets since the purpose of sampling was to determine acceptibility for human consumption as indicated by the FDA "action level."

Lake Hartwell

Lake Hartwell is located on the Savannah River between South Carolina and Georgia. Water, sediment, and fish tissue samples were collected from the lake in August, 1976 and tissue samples were collected again in April, 1977 as part of a continuing cooperative sampling effort by US-EPA, SC-DHEC and GA-EPD. Results from the analyses of these samples are presented in Tables 4 and 5. Figure II gives the sampling location for the water and sediment stations.

The maximum concentration of PCBs in water and sediment samples (2.02 µg/l and 22.08 mg/kg, respectively) collected during the August survey occurred

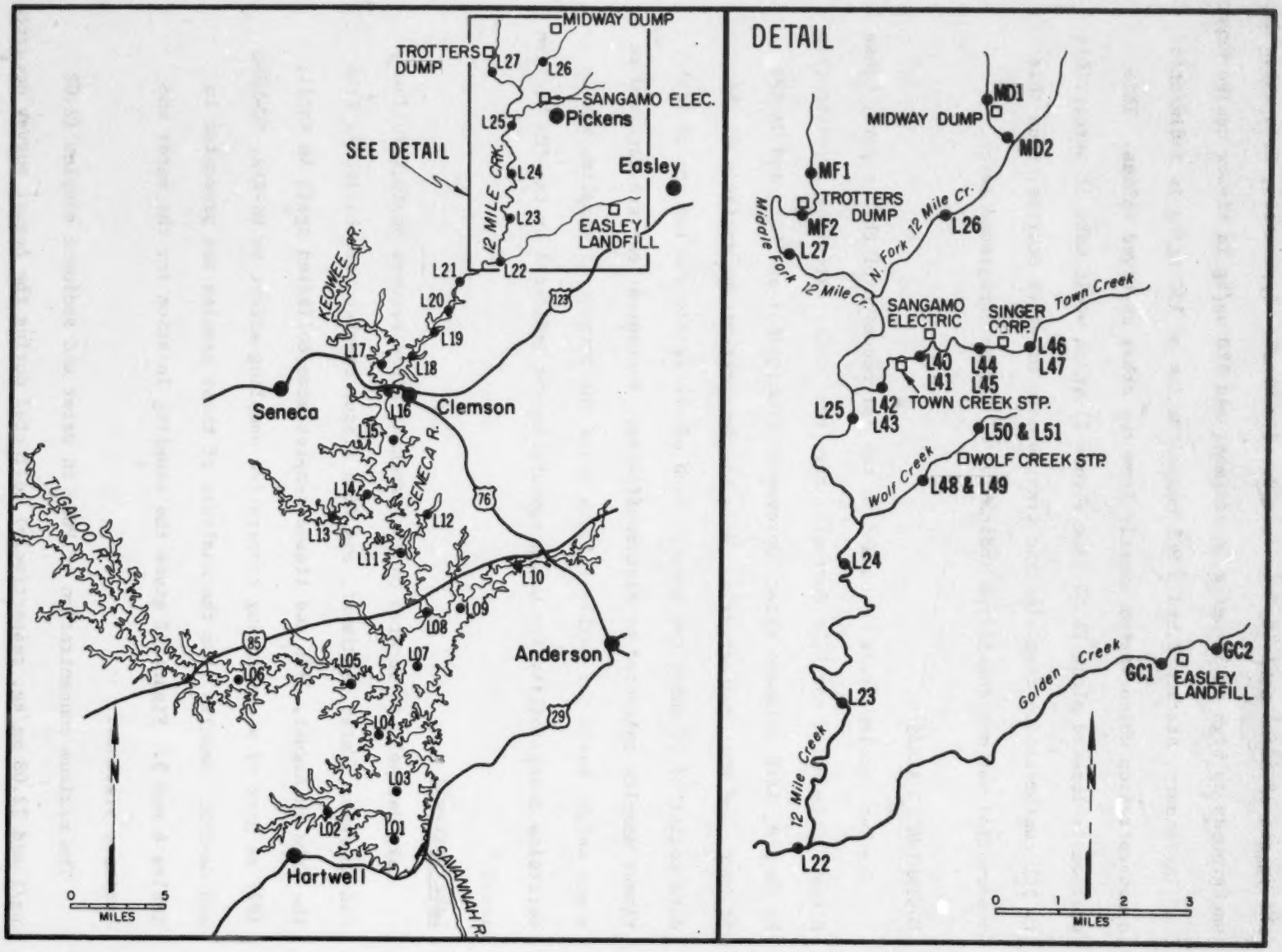

Figure II. Sampling Locations PCB Study Lake Hartwell Vicinity August, 1976

Table 4
Total PCB Concentration in Water and Sediments of Lake Hartwell

Station	Location	Date	Total PCB Water µg/l	Total PCB Sediment mg/kg/a
L-01	Lake Hartwell	8/24/76	--	ND/b
L-02	Lake Hartwell	8/24/76	--	ND
L-03	Lake Hartwell	8/24/76	--	ND
L-04	Lake Hartwell	8/24/76	--	ND
L-05	Lake Hartwell (Tugaloo R.)	8/24/76	--	0.02
L-06	Lake Hartwell (Tugaloo R.)	8/24/76	--	0.61
L-07	Lake Hartwell (Seneca R.)	8/24/76	--	0.87
L-08	Lake Hartwell (Seneca R.)	8/24/76	--	3.24
L-09	Lake Hartwell	8/24/76	--	2.64
L-10	Lake Hartwell	8/24/76	--	ND
L-11	Lake Hartwell (Seneca R.)	8/24/76	--	0.23
L-12	Lake Hartwell	8/24/76	--	ND
L-13	Lake Hartwell	8/24/76	--	0.65
L-14	Lake Hartwell (Seneca R.)	8/24/76	--	6.59
L-15	Lake Hartwell (Seneca R.)	8/24/76	--	3.46
L-16	Lake Hartwell (Seneca R.)	8/24/76	--	5.48
L-17	Lake Hartwell (Keowee R.)	8/24/76	--	0.85
L-18	Lake Hartwell (12 Mile Cr.)	8/24/76	--	18.76
L-19	Lake Hartwell (12 Mile Cr.)	8/25/76	--	0.73
L-20	Lake Hartwell (12 Mile Cr.)	8/25/76	--	4.00
L-21	12 Mile Creek	8/25/76	--	0.09
L-22	12 Mile Creek	8/25/76	--	0.53
L-23	12 Mile Creek	8/25/76	--	0.05
L-24	12 Mile Creek	8/25/76	--	0.26
L-25	12 Mile Creek	8/25/76	--	3.47
L-26	North Fork 12 Mile Cr.	8/25/76	--	0.03
L-27	Middle Fork 12 Mile Cr.	8/25/76	--	ND
L-40	Town Cr.	8/25/76	--	22.08
L-41	Town Cr.	8/25/76	2.02	--
L-42	Town Cr.	8/25/76	1.69	--
L-43	Town Cr.	8/25/76	--	3.34
L-44	Town Cr.	8/25/76	--	0.10
L-45	Town Cr.	8/25/76	<0.20	--
L-46	Town Cr.	8/25/76	--	ND
L-47	Town Cr.	8/25/76	<0.06	--
L-48	Wolf Cr.	8/25/76	--	ND
L-49	Wolf Cr.	8/25/76	ND	--
L-50	Wolf Cr.	8/25/76	ND	--
L-51	Wolf Cr.	8/25/76	--	ND
MF-1	Middle F. 12 Mile Cr.	8/24/76	ND	0.23
MF-2	Middle F. 12 Mile Cr.	8/24/76	ND	ND

/a - Calculated on a dry weight basis.

/b - ND (None detected).

Table 5
Mean Concentration of Total PCBs[/a] for Various Groups[/b]
of Fish from Lake Hartwell

Fish Grouping	12 Mile Creek Area		Seneca River Area		26 Mile Creek Area		Tugaloo River Area		Savannah River Area	
	Aug 76	Apr 77	Aug 76	Apr 77	Aug 76	Apr 77	Aug 76	Apr 77	Aug 76	Apr 77
Catfish/Bullhead	54 (10)	45 (27)	5.3 (8)	8.9 (23)	1.2 (7)	3.3 (27)	0.1 (2)	0.3 (22)	2.4 (7)	0.8 (28)
Striped Bass/ White Bass/ Hybrid Stripe Bass	25 (11)	10 (22)	7.5 (8)	5.1 (14)	3.4 (7)	6.5 (23)	0.1 (3)	4.1 (37)	2.3 (10)	6.1 (26)
Largemouth Bass/ Coosa Bass/ Spotted Bass	23 (8)	7.5 (24)	4.8 (7)	1.3 (25)	0.6 (5)	0.6 (20)	0.2 (6)	0.3 (22)	1.2 (11)	0.6 (25)
Bluegill	16 (1)	--	1.1 (1)	--	--	--	--	--	--	--
Walleye	110 (1)	--	--	--	1.0 (6)	--	--	--	--	--
Crappie	11 (3)	--	--	--	--	--	--	--	--	--

/a - All concentrations are for fish fillets and are reported mg/kg on a wet weight basis.

/b - Grouped according to feeding and migration habits.

/c - The number in parenthesis indicates the number of fish used to calculate the mean.

on Town Creek at Stations L-40 and L-41. The next highest sediment concentration (18.76 mg/kg) was on the 12 Mile Creek arm of Lake Hartwell (Station L-18). In general, sediment concentrations of PCBs decreases with distance from Town Creek and the 12 Mile Creek arm of the lake (downstream from Sangamo Electric Company).

Fish tissue samples collected in both the August 1976 and April 1977 studies show the same general trends as did the sediment samples. Mean tissue concentrations collected in the 12 Mile Creek arm of the lake were well above the FDA "action level" during both surveys (see Table 5). The samples taken in the Seneca River area (i.e., Lake Hartwell between the I-85 bridge and the US 123 bridge) had lower mean concentrations of PCBs than the samples from 12 Mile Creek arm, but the values were still in excess of the FDA "action level" for both catfish and stripped bass.* Except for concentrations found in striped bass, mean tissue analyses for the other areas sampled were less than the FDA "action level."

Striped bass are migratory feeders which move throughout the lake. The presence of PCBs in their tissue indicate overall contamination, while PCBs in the more territorial catfish and largemouth bass indicate more localized contamination. This is illustrated in Table 5 by the relatively consistent concentrations found in the striped bass from various areas of the lake and the elevated levels in catfish and largemouth bass from the 12 Mile Creek area.

Coosa River

Fish tissue samples for the Coosa River and Lake Weiss were collected by the GA-EPD, AWIC and EPA between May 7, 1976 and October 22, 1976. A summary

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* Striped bass as used in this report refers to striped bass (Morone Saxatilis), white bass (Morone Chrysops), and hybrid stripe bass (Morone Sp. (Hybrid).

of the results from these samples is presented in Table 7. Table 6 gives results for water and sediment samples collected between August 18, 1976 and September 1, 1976. Station locations and areas where fish were collected are given in Figure III.

The maximum concentration detected in sediments (10.9 µg/kg) was in Dry Creek adjacent to the General Electric Company at Rome, GA. This level was reflected somewhat in the Oostanaula River below Dry Creek with a sediment concentration of 0.14 µg/kg as compared to non-detectable concentration upstream. This concentration is low, however, when compared to the sediment concentration downstream from the Rome STP (Station C-2) of 1.00 µg/kg.

Areas of sedimentation within Lake Weiss (C-5 and C-7) had the highest sediment concentrations (2.4 µg/kg and 1.5 µg/kg; and 3.9 µg/kg, respectively) except for Dry Creek. Water samples collected from the lake showed a decreasing trend from the headwaters (0.13 µg/1) to the dam (0.05 µg/1). The concentration at the Cedar Bluff water intake was 0.12 µg/1 which is below the drinking water "level of concern." All water concentrations were in excess of the water quality criterion for the protection of fish and wildlife.

In order to simplify the data presentation, fish species were separated into 6 groups according to similar feeding habits. A mean concentration for each group was then calculated for each area where samples were collected (Table 7). Gizzard Shad collected in Area 1 had the highest mean concentration (66 mg/kg) of all the fish collected (based on two fish). Catfish had high concentrations in all areas, but the lowest concentration was in Area 2 which had the highest sediment concentration of all the areas where fish were caught. Carp and buffalo, the other bottom feeders sampled, had a mean PCB concentration of 14 mg/kg in Area 2. This was slightly less than the catfish caught in the area but well above the FDA "action level."

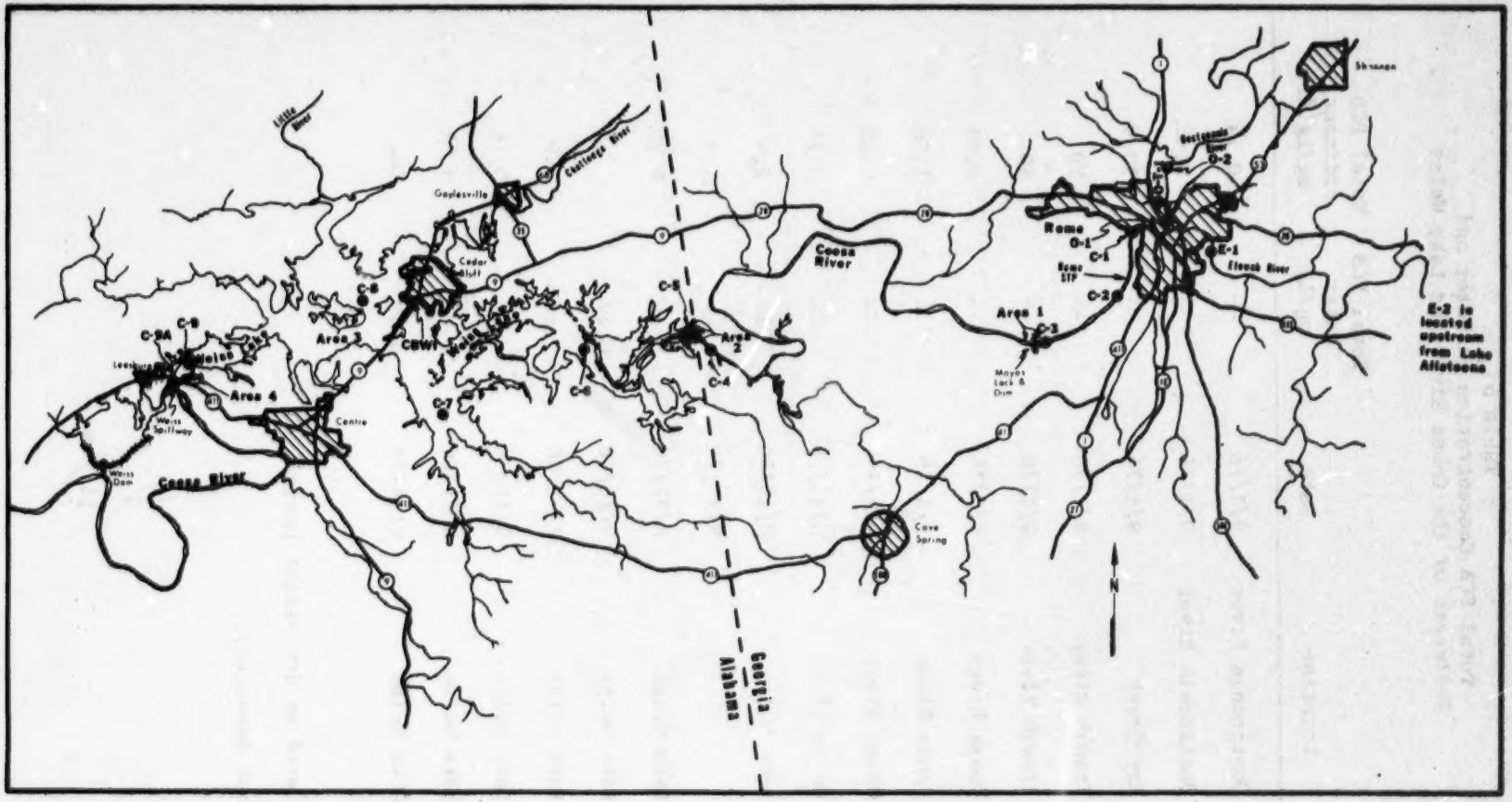

Figure III. Coosa River and Lake Weiss Sampling Locations

Table 6
Total PCB Concentration In Water and
Sediments of the Coosa River and Lake Weiss

Station Number	Location	Date	Total PCB Water mg/1	Total PCB Sediment mg/kg/a
O-1	Oostananla River	9/1/76	--	0.14
O-2	Oostananla River	9/1/76	--	ND/b
O-T-1	Dry Creek	9/1/76	--	10.9
E-1	Etowah River	9/1/76	--	ND
E-2	Etowah River	9/1/76	--	ND
C-1	Coosa River	9/1/76	--	0.08
C-2	Coosa River	9/1/76	--	1.00
C-3	Coosa River	9/1/76	--	0.45
C-4	Coosa River	8/31/76	--	0.76
C-5	Lake Weiss	8/19/76	0.13	2.4
		8/31/76	--	1.5
C-6	Lake Weiss	8/31/76	--	0.70
CBWI	Lake Weiss	8/18/76	0.12	--
C-7	Lake Weiss	8/31/76	--	3.9
C-8	Lake Weiss	8/31/76	--	0.18
C-9	Lake Weiss	8/31/76	--	0.88
C-9a	Lake Weiss	8/18/76	0.05	--

/a - Calculated on dry weight basis.

/b - ND (None detected).

Table 7
Mean Concentration of PCBs/a For Various Groups/b
Of Fish From The Coosa River and Lake Weiss

Fish Grouping	Area 1 Near Mayos L&D	Area 2 Near AL/GA Stateline	Area 3 Near Cedar Bluff Water Intake	Area 4 Near Spillway Dam
Catfish (Channel/ Blue/Flat-head)	46(4)/c	20(8)	46(13)	43(13)
Largemouth Bass	3.9(2)	8.3(14)	4.6(11)	8.2(14)
Crappie (Black/ White)	--	2.6(8)	2.8(8)	5.9(11)
Bream (Bluegill/ Sunfish)	7.8 (2)	5.2(5)	--	--
Carp/ Buffalo	--	14(4)	--	--
Gizzard Shad	66(2)	--	--	--

/a - All concentrations are for fish fillets and are reported in mg/kg of Aroclor 1254 a wet weight basis. Aroclor 1254 was the only PCB found in these sampes.

/b - Grouped according to feeding and migration habits.

/c - The number of parenthesis indicates the number of fish used to calculate the mean.

Largemouth bass, crappie and bream (bluegill and sunfish) had much lower mean PCB concentrations than the bottom feeders or the shad. However, several of the mean concentrations exceeded the FDA "action limit." There is no significant trend within these groups.

PCBs appear to be distributed homogeneously throughout the Coosa River-Lake Weiss area sampled in this survey. Some heterogeneity is apparent in sediment concentrations of total PCBs with high concentrations correlating strongly with areas of sedimentation within the lake. There is no apparent correlation between high PCB concentrations in fish and in sediment. This finding coupled with the detectable PCB concentrations in the water and the high concentration of PCBs in gizzard shad, implies that the PCBs are entering the food chain directly from the water probably through the plankton and/or periphyton communities, and possibly directly through the gills.

AMBIENT CONCENTRATIONS

In an attempt to determine potential PCB problem areas in the southeast, PCB data were retrieved from the STORET water quality file. The STORET data in some instances have been supplemented with data provided by the states and the USGS through personal communications (5)(6). Data presented in Table 8 represent those stations with one or more observations of total PCB concentration equal to or greater than: 100 µg/kg in the sediments, or 0.1 µg/l in whole water samples.

The values presented in Table 8 are annual and gross means of one or more values and, therefore do not always meet the above criteria. However, in all cases, at least one observation met the stated criteria.

Ft. Lauderdale, Florida Area

There were a large number of stations in the Ft. Lauderdale area which exceeded the criteria and are included in Table 8. Of these stations, six had

mean sediment concentrations (i.e., the mean of all data for the period of record at the station) greater than 100 µg/kg. The gross mean of 1900 µg/kg at Station 261345080274500 (S-11 Canal at Levee 38E near Andytown) is of questionable importance, however, since it represents only one sample collected during 1972. The station of major concern is station number 260514080110800 (N. New River Canal at SW 31st Ave., Ft. Lauderdale), located near a marina, with a gross mean of 168,158 µg/kg. The highest concentration encountered (1,300,000 µg/kg) could be due to paints and other coatings containing PCBs as plasticizers which enter the sediments as a result of boat painting and repair operations at the marina.

Miami, Florida Area

There were five stations in the Miami area which are included in Table 8. However, no data are available for these stations since 1973. Of the stations listed, two had gross mean sediment concentrations in excess of 300 µg/kg, one of which was a result of only one sample collected during 1973 and the other a result of samples collected prior to 1972.

Everglades

Five stations in the Everglades water conservation area met the criteria for inclusion in Table 8. This was somewhat surprising since this area is isolated and thus should be removed from suspected contamination. Two of these stations (255120080540000 and 254550080403000) are located along US 41, which could provide a pathway for PCB contamination from transformer leakage associated with powerlines along the roadway.

Atlanta, Georgia Area

This area includes the Chattahoochee River from Atlanta to Franklin, GA, and the Ocmulgee River Basin from Atlanta to Macon, GA, which also encompasses South, Yellow, and Alcovy Rivers. Several stations in this area met the criteria for inclusion in Table 8. However, data after 1973 is sparse. Gross mean

Table 8
PCB Concentration At Selected Station in the Southeast

Station No.	Location	Mean Concentration Sediment µg/kg 1972	1973	1974	1975	1976	Gross mean[a] µg/kg	Maximum Conc. Whl. Water Samples µg/l
Ft. Lauderdale Area								
262000080320500	North New R. C. ab. S-7	40	20	85	60	--	51	--
261345080274500	S-11 C. @ Levee 38E nr Andytown	1900	--	--	--	--	1900	0.0
02284700	N. New R. Canal @ 20 Mile Bend	48	243	0	39	320	143	0.0
02285400	South New R. C. @ S-9	5	7	15	0	0	8	<0.1
260919080172300	Middle R. C. nr Lauderhill	0	67	--	44	0	35	0.1
260807080140200	Plantation C., NW 65th Ave., Pla.	602	12	560	--	0	327	0.0
02283200	Plantation Rd. C. @ S-33 nr Ft. Laud.	157	80	170	46	0	109	<0.1
260743080103100	N. Fork New R. @ Ft. Lauderdale	15	155	7	31	0	55	0.0
260717080094700	N. Fork New R., Brwd. Blvd., Ft. Laud.	--	--	68	120	--	94	0.0
260702080085800	New R. SW 4th & 7th Ave., Ft. Laud.	50	10	20	160	60	51	<0.1
260514080110800	N. New R.C. @ SW 31st Ave., Ft. Laud.	20	14706	7	1300000	--	168158	<0.1
260313080084300	Davis Cutoff C., W. of FECRR Br.	100	0	--	--	--	50	0.0
260207080110600	Rainfall, 2202 N. 45th Ave., Hollywood, FL	--	--	--	--	--	--	<0.1
260031080145300	Davie Rd., C. @ Pembroke Pines, FL	10	33	29	110	0	30	0.0
02281500	Hillsborough C. nr Deerfield Beach	0	0	0	0	0	0	0.1
02282000	Pompano C. @ Pompano Beach	225	90	20	17	180	119	0.0
02282100	Cypress Cr. C. @ S-37A nr Pom.	30	20	2	0	38	29	<1.0
Miami Area								
254719080181300	1st St. Drain Ditch, Miami	20	--	--	--	--	357	0.0
254812080182000	Barrow Pit C. @ Ludlow Rd.	--	--	--	--	--	--	0.1
02288500(WPI[b])	Miami C. nr Hialeah Well Field	95	--	--	--	--	63	0.0
254818080160100	Drain D. NE Cor. Miami Int.	45	--	--	--	--	28	0.4
02290510	Miami C. @ NW 27th Ave.	--	320	--	--	--	320	--
Everglades Area								
02286700	Miami C. @ S-8 nr Lake Harbor	400	110	82	0	--	130	--
255120080540000	Cypress Sw. nr Jetport Borrow	0	0	387	--	--	105	0.0
254550080403000	Levee 67C. @ S-12E nr Homestead	20	0	8500	0	--	1706	0.0
02290820	Everglades P-38 nr Homestead	--	60	0	70	--	50	0.0
02290800	Taylor Slough nr Homestead	0	12	--	155	--	67	0.0
Atlanta Area								
02203800	South R. @ Bouldercrest Rd.	--	14	--	--	--	257	--
02203900	South R. @ Flakes Mill Rd.	--	--	--	--	--	600	--
02204070	South R. @ Klondike Rd.	--	260	--	--	--	780	--
02204520[c]	South R. @ SR81 @ Snapp	--	204	--	--	--	536	--
02204870	South R. @ SR36 @ Jackson	--	--	--	--	--	409	--
02208040	South R. - 1 mile ab. Alcovy R.	--	--	--	--	--	57	--
02209560	Ocmulgee R. ab. Tussahaw Cr., Ja.	300	--	--	--	--	300	--
05010001(WPI)	Ocmulgee R. @ Macon WPI	--	--	327	6000[d]	--	3164	--
12140001	Chattahoochee R. @ SR92	--	260	--	--	--	260	--
12150001	Chattahoochee R. @ SR16	--	180	--	--	--	180	--
12170001	Chattahoochee R. @ SR27	--	200	--	--	--	200	--
Rome Area[e]								
14040001	Conasauga R. @ FAS1800 nr Resaca	--	410	--	--	--	410	--
14250001(WPI)	Coosawattee R. @ Rome WPI	--	--	165	--	--	165	--
14400001	Coosa R. @ Mayes	--	930	--	--	--	930	--
14450001	Coosa R. @ GA-AL Stateline	--	1800	253	11000	--	4351	--
Mississippi Area								
02472999	Bowie R. @ mouth @ Hattiesburg	--	--	--	--	--	170	--
02485500	Pelahatchie Cr. nr Fannin	--	--	--	125	1	63	<0.05

[a] - Mean for all data for period of record for station.

[b] - WPI indicates that the station is located at a Water Treatment Plant Intake.

[c] - Also GA-EPD station no. 04113001 at same location.

[d] - "Subsequent investigations did not verify this number," according to October 13, 1976 letter from Larry Neal.

[e] - This area is currently under surveillance by GA-EPD, AWIC, and US-EPA.

concentrations in sediments for this area were high compared to other areas included in the "Ambient Concentrations" section of this report (10 of 11 >100 µg/kg and 6 of 11 >300 µg/kg). The most critical location in this area is station 05010001 on the Ocmulgee River at the Macon Water Treatment Plant intake. Since the 6000 µg/kg concentration was detected in August, 1975, the Georgia Environmental Protection Division (EPD) has investigated the intake and area upstream as far as Lake Jackson and "no high PCB contaminations were found" (5).

Rome, Georgia Area

This area has the highest gross mean concentrations in sediments of any area included in this study. The area is currently under a commercial fishing ban and is being investigated by the US-EPA, AWIC, and GA-EPD (See "Contaminated Areas - Coosa River" this report). Station 14250001 is located at the Rome Water Treatment Plant intake.

Mississippi Area

Only two stations in the State of Mississippi met the criteria for inclusion in Table 8. Of these stations, the gross mean concentrations in sediments at one was based on only one samples collected prior to 1972 and the other has only two observations in sediments the most recent of which was 1 µg/kg. This area, therefore, would carry the lowest priority for concern of the areas included in this study.

RECOMMENDATIONS

1. Surveillance should continue along the Coosa, Oostananla, Conasauga and Etowah Rivers in the Rome, GA area until the PCB problem is abated.
2. Surveillance should also continue in Lake Hartwell, especially in the Twelve Mile Creek and Seneca River arms, until the PCB problem is abated. Striped bass should be monitored throughout all areas of the lake.

3. Periodic surveillance, including fish tissue and sediment analyses, should be continued along the Chattahoochee and Ocmulgee Rivers (including South and Yellow Rivers below Atlanta, GA). Particular attention should continue to be given to the stretch of the Ocmulgee adjacent to the Macon Water Treatment Plant intake.

4. Periodic surveillance, including fish tissue and sediment analyses, should be conducted in Ft. Lauderdale, Miami, and Everglades Water Conservation areas of South Florida. A thorough investigation should be conducted in the vicinity of station 260514080110800 (N. New River Canal at SW 31st Ave., Ft. Lauderdale) to determine the source and extent of PCB contamination in this reach.

5. Periodic sampling for PCB and other persistent organic compounds in sediments and fish tissues should be carried out as part of on-going ambient monitoring programs in order to detect build-ups of these compounds before hazardous concentrations are reached.

REFERENCES

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5. Neal, Larry A., Georgia Department of Natural Resources, Environmental Protection Division, Letter of October 13, 1976 to David W. Hill, US-EPA regarding PCB monitoring.
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